



Name: M. Umer Farooq, Quiz Subject:

Physics

Time Remaining: 45/45 (Minutes)**Q.1****TEST 8 THERMODYNAMICS A****Physics Unit Wise**

Two identical sample of a gas are allowed to expand (i) isothermally (ii) adiabatically. Work done is

- A) More in the isothermal process
- B) More in the adiabatic process
- C) Equal in both processes
- D) Neither of them

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- A
- B
- C
- D

Next



Time Remaining: 44/45 (Minutes)

Q.2

TEST 8 THERMODYNAMICS A

Physics Unit Wise

Average kinetic energy of molecules is

- A) Directly proportional to square root of temperature
- B) Independent of absolute temperature
- C) Directly proportional to absolute temperature
- D) Inversely proportional to absolute temperature

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Correct Answer:

- A
- B
- C
- D

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Time Remaining: 44/45 (Minutes)

Q.3

TEST 8 THERMODYNAMICS A

Physics Unit Wise

For hydrogen gas $C_p - C_v = a$, and for oxygen gas $C_p - C_v = b$, so that relation between a and b given by

A) $a = 16 b$ B) $a = b$
C) $16 a = b$ D) $a = 4 b$

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Correct Answer:

A B C D

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Time Remaining: 44/45 (Minutes)

Q.4

TEST 8 THERMODYNAMICS A

Physics Unit Wise

According to kinetic theory of gasses at absolute zero temperature

- A) Water freezes
- B) Molecules motion stops
- C) Liquid helium freezes
- D) Liquid hydrogen freezes

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Correct Answer:

- A
- B
- C
- D

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Time Remaining: 44/45 (Minutes)

Q.5

TEST 8 THERMODYNAMICS A

Physics Unit Wise

If $C_p - C_v = R$ and $\frac{C_p}{C_v} = \gamma$, then which relation is correct

A) $C_v = \frac{R}{\gamma-1}$ B) $C_v = \frac{\gamma R}{\gamma-1}$
C) $C_v = \frac{R^2}{\gamma}$ D) $C_v = \frac{\gamma-1}{R}$

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Correct Answer:

A B C D

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Time Remaining: 43/45 (Minutes)

Q.6

TEST 8 THERMODYNAMICS A

Physics Unit Wise

In an isothermal process the volume of an ideal gas is halved. One can say that

- A) Internal energy of the system decreases
- B) Work done by the gas is positive
- C) Work done by the gas is negative
- D) Internal energy of the system increases

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Correct Answer:

- A
- B
- C
- D

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Time Remaining: 43/45 (Minutes)

Q.7

TEST 8 THERMODYNAMICS A

Physics Unit Wise

The characteristic equation of gases $PV = nRT$ holds good for

- A) monoatomic gases
- B) real gases
- C) diatomic gas
- D) ideal gases

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Correct Answer:

- A
- B
- C
- D

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Time Remaining: 43/45 (Minutes)

Q.8

TEST 8 THERMODYNAMICS A

Physics Unit Wise

The processes or systems that do not involve heat are called

- A) isothermal processes
- B) thermal processes
- C) equilibrium processes
- D) adiabatic processes.

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Correct Answer:

- A
- B
- C
- D

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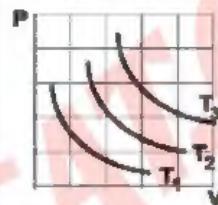
Q.9

TEST 8 THERMODYNAMICS A

Physics Unit Wise

The state of an ideal gas was changed three times at three different temperatures. The diagram represents three different isothermal curves. Which of the following is true about the temperature of the gas?

- A) $T_1 > T_2 > T_3$
- B) $T_1 > T_2 < T_3$
- C) $T_1 < T_2 < T_3$
- D) $T_1 > T_2 = T_3$



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Correct Answer:

- A
- B
- C
- D

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Time Remaining: 43/45 (Minutes)

Q.10

TEST 8 THERMODYNAMICS A

Physics Unit Wise

The average molecular kinetic energy of a gas depends on:

- A) Pressure
- B) Volume
- C) Temperature
- D) Number of moles

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Correct Answer:

- A
- B
- C
- D

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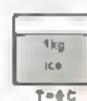


TEST 8 THERMODYNAMICS A

Physics Unit Wise

Three containers filled with 1 kg of each: water, ice, and water vapor at the same temperature $T = 0^\circ\text{C}$. Which of the following is true about the internal energy of the substances?

- A) $U_{\text{water}} > U_{\text{ice}} > U_{\text{vapor}}$
- B) $U_{\text{water}} < U_{\text{ice}} > U_{\text{vapor}}$
- C) $U_{\text{water}} = U_{\text{ice}} = U_{\text{vapor}}$
- D) $U_{\text{ice}} < U_{\text{water}} < U_{\text{vapor}}$



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P12

TEST 8 THERMODYNAMICS A

Physics Unit Wise

The state of an ideal gas is changed isothermally from position 1 to position 2 is shown above. What is the change in the internal energy of the gas during this process?

- A) $\Delta U = W$
- B) $\Delta U = Q$
- C) $\Delta U > 0$
- D) $\Delta U = 0$



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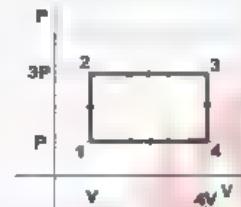


TEST 8 THERMODYNAMICS A

Physics Unit Wise

An ideal gas is taken through a closed path 1→2→3→4→1. What is the net work done by the gas?

- A) 6PV
- B) 9PV
- C) 4PV
- D) -6PV



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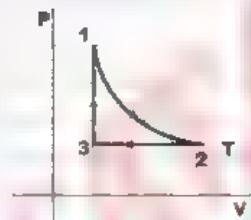


TEST 8 THERMODYNAMICS A

Physics Unit Wise

A sample of an ideal gas taken through a closed cycle is presented by the P-V diagram. The process 1-2 is perfectly isothermal. Which of the following is true about the change in Internal energy and work done by the gas during the process 1-2?

A) $\Delta U = 0$	W by the gas > 0
B) $\Delta U > 0$	W by the gas $= 0$
C) $\Delta U < 0$	W by the gas < 0
D) $\Delta U = 0$	W by the gas $= 0$



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Double Answer



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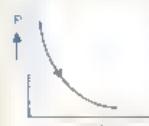
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TEST 8 THERMODYNAMICS A

Physics Unit Wise

The PV diagrams representing maximum and minimum amount of work done are respectively



A)



B)



C)



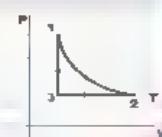
D)

A) A and B

B) B and C

C) B and D

D) C and D



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Physics

Time Remaining: 42/45 (Minutes)

Q16

TEST 8 THERMODYNAMICS A

Physics Unit Wise

In the relation of $n = \frac{PV}{RT}$, n is RT

- A) Number of molecules
- B) Atomic number
- C) Mass number
- D) Number of moles

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Time Remaining: 42/45 (Minutes)

TEST 8 THERMODYNAMICS A

Physics Unit Wise

Which is called Internal energy of an Ideal gas?

- A) potential energy
- B) vibrational kinetic energy
- C) translational kinetic energy
- D) rotational kinetic energy

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Time Remaining: 42/45 (Minutes)

P18

TEST 8 THERMODYNAMICS A

Physics Unit Wise

Cloud formation in atmosphere is an example of

- A) isothermal process
- B) adiabatic process
- C) isochoric process
- D) isobaric process

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Physics

Time Remaining: 42/45 (Minutes)

TEST 8 THERMODYNAMICS A

Physics Unit Wise

In adiabatic expansion

- A) $\Delta U=0$
- B) $\Delta U=\text{negative}$
- C) $\Delta U=\text{positive}$
- D) $\Delta W=\text{zero}$

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Time Remaining: 41/45 (Minutes)

Q.20

TEST 8 THERMODYNAMICS A

Physics Unit Wise

A cycle tyre bursts suddenly. This represents

- A) Isothermal process
- B) Isobaric process
- C) Isochoric process
- D) Adiabatic process

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Time Remaining: 41/45 (Minutes)



TEST 8 THERMODYNAMICS A

Physics Unit Wise

A gas expands 0.25 m^3 at constant pressure 10^3 N/m^2 , the work done is

- A) 2.5 ergs
- B) 250 J
- C) 250 W
- D) 250 N

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Time Remaining: 41/45 (Minutes)

TEST 8 THERMODYNAMICS A

Physics Unit Wise

The difference of molar specific heats at constant pressure and constant volume is called:

- A) Molar heat
- B) Heat constant
- C) Boltzman constant
- D) Universal gas constant

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Time Remaining: 40/45 (Minutes)



TEST 8 THERMODYNAMICS A

Physics Unit Wise

If Q is amount of heat added to a system and W is work done by the system, then change in internal energy can be defined as

- A) $Q - W$
- B) W/Q
- C) Q/W
- D) $1 + Q/W$

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Time Remaining: 40/45 (Minutes)

Q24

TEST 8 THERMODYNAMICS A

Physics Unit Wise

Working of bicycle pump is based upon

- A) adiabatic process
- B) isothermal process
- C) isochoric process
- D) isobaric process

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Time Remaining: 40/45 (Minutes)

TEST 8 THERMODYNAMICS A

Physics Unit Wise

Mass (m) of one molecule of a gas can be written as

A) Molecular mass x N_A

B) $\frac{\text{Molecular Mass}}{N_A}$

C) $\frac{N_A}{\text{Molecular Mass}}$

D) Molecular mass + N_A

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Time Remaining: 40/45 (Minutes)

Q. 26

TEST 8 THERMODYNAMICS A

Physics Unit Wise

If the volume of a gas is held constant and we increase its temperature then.

- A) its pressure is constant C) its pressure falls
- B) its pressure rises D) any of above

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Time Remaining: 40/45 (Minutes)

TEST 8 THERMODYNAMICS A

Physics Unit Wise

In which of the processes, internal energy of system remains constant?

- A) Adiabatic
- B) Isochoric
- C) Isobaric
- D) Isothermal

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Time Remaining: 40/45 (Minutes)

Q.25

TEST 8 THERMODYNAMICS A

Physics Unit Wise

Normal Human body Temperature is

- A) 98 °F
- B) 37 °F
- C) 102 °F
- D) 300 K

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Time Remaining: 39/45 (Minutes)

Q.29

TEST 8 THERMODYNAMICS A

Physics Unit Wise

A difference of temperature of 25°C is equivalent to difference of

- A) 45°F
- B) 72°F
- C) 32°F
- D) 25°F

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Correct Answer:

- A
- B
- C
- D

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Time Remaining: 39/45 (Minutes)

Q.30

TEST 8 THERMODYNAMICS A

Physics Unit Wise

Which one of the expressions is correct for the molar volume V_m of an ideal gas?

A) $\frac{RT}{P}$
B) $\frac{NART}{P}$
C) $\frac{nRT}{P}$
D) $\frac{nkT}{P}$

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Correct Answer:

A B C D

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Thursday Test NO # 08

5-8-2021

Thermodynamics - 1

Answer key

1 A 2 C 3 B 4 B 5 A 6 C 7 D 8 D 9 C 10 C
11 C 12 D 13 A 14 A 15 D 16 D 17 C 18 B 19 B 20 D
21 B 22 D 23 A 24 A 25 B 26 B 27 D 28 A 29 A 30 A

Discussion

MCO NO # 05 $C_p - C_v = R$

$$\gamma C_v - C_v = R$$

$$C_v (\gamma - 1) = R$$
$$C_v = \frac{R}{\gamma - 1}$$

$$\gamma = \frac{C_p}{C_v}$$

$$C_p = \gamma C_v$$

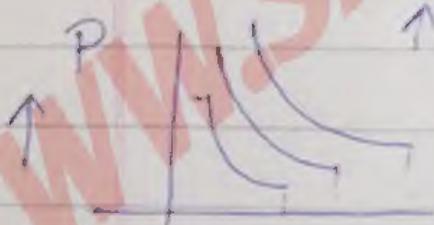
put into

MCO NO # 09 $PV = nRT$ $nR = \text{constant}$

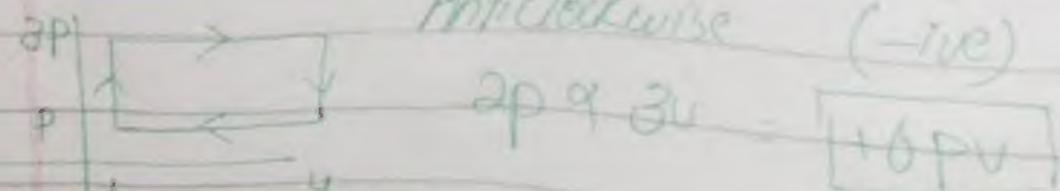
\uparrow $PV \propto T$ According to graph

\Rightarrow $W \propto T$ \Rightarrow W

\Rightarrow $W \propto T$ \Rightarrow isotherm



MCO NO # 13 clockwise work (+ve)
Anticlockwise (-ve)



MCO NO 14 for isothermal process $\Delta U = 0$ $[W = 0]$

MCE NO 21

$$w = P\Delta V = 10^3 \times 0.25$$

$$= 10^3 \times \frac{25}{100} = 10 \times 25 = 250$$

MCE NO 23

Heat added to system = +ve

work done by the system = +ve

$$\theta = \Delta U + w$$

$$\Delta U = \theta - w$$

$$\Delta U = \theta + (-w) \quad \boxed{\theta - w}$$

MCE NO 29

Short Int. $\Delta F = \frac{9}{5} \Delta C$

$$= \Delta F = \frac{9}{5} \times 20^\circ C = 9 \times 5 = 45^\circ F$$

MCO NO 7

$$PV = nRT$$

for molar volume $\cdot n-1$

$$PV_m = RT \quad \boxed{V_m = \frac{RT}{P}}$$